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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/799,051	03/11/2004	Giovanni Gilardi	AVAN/001112	6732

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EXAMINER

CHIAM, DINH D

ART UNIT

PAPER NUMBER

2883

DATE MAILED: 06/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/799,051

Applicant(s)

GILARDI ET AL.

Examiner

Erin D. Chiem

Art Unit

2883

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 March 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☒ Claim(s) 2-7, 1-16 and 18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on March 11, 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 6/6/05
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the recitation of *—the microstrip line comprises a first section of a microstrip line and a second section of a coplanar waveguide. --* Must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

1. Claims 2, 7, 13, and 18 are objected to because of the following informalities: it is unclear whether there are two chips: (1) the modulator chip (2) the Lithium Niobate chip or the Applicant intends to recite *–the modulator chip is formed from Lithium Niobate--*.
2. Claims 3-6, and 14-16 are objected to because of the following informalities: the specification defined the transmission lines may be microstrips or coplanar waveguide; however Applicant claims “*coplanar line*” which is not defined in the specification nor does the phrase “coplanar line” a well-known term in the art. Furthermore, in claim 5 recites a “*coplanar waveguide*” and claim 5 is dependent on claim 3 which recites “*coplanar line*”; Are they structurally different? Appropriate correction is required. For prosecution purpose, the Examiner will interpret the two recitations to be equivalent.
3. Claims 7 and 18 are objected to because of the following informalities: “Lithium Niobate chip” lacks antecedent basis.
4. Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 3-4, 7, 9-12, 14, 15, 18, and 20 rejected under 35 U.S.C. 102(b) as being anticipated by Ishimura et al. (US 5,602,672).

Art Unit: 2883

7. Regarding claims 1, 9-11, Ishimura et al. teach a light modulator module comprising a semiconductor modulator chip (Fig. 6; 1) and a microwave input chip 3, formed of alumina, coupled to the modulator chip having a thin film resistor 5. Regarding the limitation, recited in the claim, "thin film resistor with a low impedance," no weight is given to the limitation because relative term "low" has no point of reference.

8. Regarding claim 3, 4, 14, and 15, Ishimura et al. further teach the microstrip line in the microwave input chip 3 and the thin film resistor 5 being placed in the microstrip line; wherein the microstrip line is a straight line. Regarding the recitation in the alternative of "...microstrip line or in the coplanar line" indicates the obviousness of the structural equivalency

9. Regarding claims 7 and 18, the modulator chip 1 is bonded by the bonding pad 21, 22, and the wire 10.

10. Regarding claim 12, employing lumped resistance is implicitly anticipated by Ishimura et al. In Figure 1(b), clearly the network analysis provided teaches that conventional lumped resistor maybe employed. However, Ishimura et al. further teach the improvement of impedance matching by employing a thin-film resistor since the resistance is easily controllable by increasing or decreasing the controlling signal to the thin-film resistor. Prior to the knowledge of thin-film resistor, lumped resistors are prevalently used, therefore, it is inherent that if without the thin-film resistor, lumped resistor must be used to provide impedance in the network.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 2883

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 2 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishimura et al. Ishimura et al. teach light modulator module comprising a semiconductor modulator chip (Fig. 6; 1) and a microwave input chip 3, formed of alumina, coupled to the modulator chip having a thin film resistor 5. Ishimura et al. do not explicitly teach the modulator is formed of Lithium Niobate, however, Lithium Niobate is a well-known semiconductor compound. The motivation for forming the modulator from Lithium Niobate for it's characteristically high melting point (1253° C) and high optical-damage threshold.

13. Claims 5, 8, 16 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishimura et al. in view of Mineo et al. (US 6,101,295).

14. Ishimura et al. teach a light modulator module comprising a semiconductor modulator chip (Fig. 6; 1) and a microwave input chip 3, formed of alumina, coupled to the modulator chip having a thin film resistor 5. The microwave input chip 3 comprises a microstrip and the thin film resistor 5 being placed in the microstrip line; wherein the microstrip line is a straight line. However Ishimura et al. do not teach a first section of a microstrip line and a second section of a coplanar waveguide.

15. Mineo et al. teach an optical modulator employing high frequency circuit comprising a microstrip line (Fig. 6(a); 14), a modulator 48, thin-film resistor (col. 5, line 56), and furthermore Mineo et al. teach the waveguide area extend in a direction which intersects at the right-angles the direction of orientation of the microstrip line (col. 2, line 61-64). This recitation reads upon the broad limitation of the --*microstrip line comprises a first section of a microstrip line and a*

Art Unit: 2883

second section of a coplanar waveguide.— Mineo also teach the module is fixed with a high frequency connector (Fig. 2A; 36), also known as RF connector, at the microstrip end for the purpose of packaging the module in a more readily usable module.

16. Since Ishimura et al. and Mineo et al. are both from the same field of endeavor, the purpose disclosed by Mineo et al. would have been recognized in the pertinent art of Ishimura et al.

17. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the microwave waveguide line into the crystalline substrate and deposited the microstrip such that the two thin structures intersect. **The motivation** for forming the microwave chip having a portion of the coplanar waveguide intersecting the microstrip is to integrate the high-frequency circuit with an optical modulator formed of coplanar waveguide. The position of the waveguide and the microstrip is matched thus forming the lens on the incident light of the emitted light side without distancing the position of the waveguide from the modulator, thus preventing the lens and the high frequency circuit from impinging on each other (col. 2, line 65 – col. 3, line 9).

18. Claims 6 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishimura et al. In Applicant's teaching [0019], the limitation of the curved path microstrip line was taught as a design choice since there Applicant does not further disclose the advantage or significance of the coplanar line comprises a curved line. **The motivation** for implementing a curved coplanar line instead of a straight coplanar line is that Applicant does not have chip surface area constraint in the design process.

Art Unit: 2883

Conclusion


19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Lee et al., Demir et al., Noda, Kojima et al. teach the high frequency microwave integrated circuit employing thin film resistor, coplanar waveguide, and optical modulator.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erin D. Chiem whose telephone number is (571) 272-3102. The examiner can normally be reached on Monday - Thursday 9AM - 5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Erin D Chiem
Examiner
Art Unit 2883


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Technology Center 2800